



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,804	03/18/2004	Daniel J. Kane	70047-42-UT	8892
5179	7590	08/10/2005	EXAMINER	
PEACOCK MYERS, P.C. P O BOX 26927 ALBUQUERQUE, NM 87125-6927			CONNOLLY, PATRICK J	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 08/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/804,804	KANE ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	Patrick J. Connolly	2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 21 September 2004.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-32 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 18 March 2004 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 7.24.04; 9.21.04.
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4, 6, 10-12, 20, 22 and 26-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 4 and 20 recite the limitation “whereby an amplitude of a signal of interest is improved by a factor of approximately two as compared to non-differential spectral interferometry.”

It is unclear what “improved” is intended to mean, whether it be an increase or decrease in amplitude of a signal of interest. Further it is unclear how the “signal of interest” relates to the spectral interferometric measurements.

The term "substantially" in claims 6, 10-12, 22 and 26-28 is a relative term that renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

With further regard to claims 6 and 22, the limitation “1/f noise” is unclear and requires further definition of f, which is assumed to be the dithering frequency, within the claims. It is unclear from where the noise is being removed, be it from a signal or the components of the complex interferogram, or both.

**Claims 4, 6, 10-12, 20, 22 and 26-28 have not been further treated on the merits.**

***Claim Rejections - 35 USC § 102***

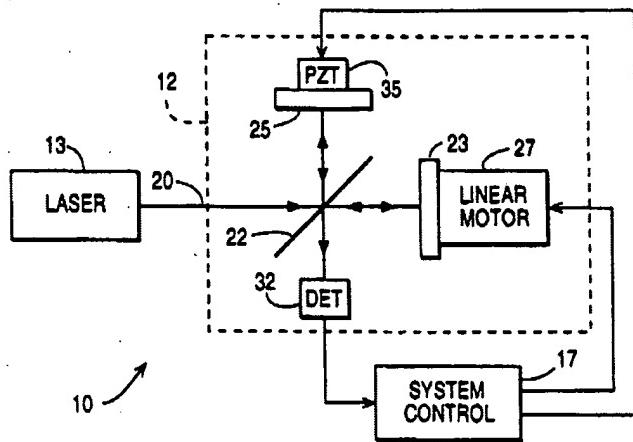
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 8, 9, 13-17, 23-25 and 29-32 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent No. 5,166,749 to Curbelo et al (hereafter Curbelo).

As to claims 1, 8, 9, 13-17, 23-25 and 29-32, Curbelo discloses a method and apparatus for Fourier transform spectrometry including (see Figure 1 below):



**FIG. 1**

a dithering element by way of a piezo translator, \*providing a continuous relative phase shift between the two arms of the interferometer (35, 17, see also columns 5 and 6);  
 a detector providing, synchronous, lock-in detection (32, 17, see also Figure 2, columns 5 and 6).

As to claims 9 and 25, Curbelo discloses implementing a phase shift of  $\pm$  90 degrees that allows for a total of 180 degrees of phase shift (see top of column 2).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Curbelo.

As to claims 2 and 18, Curbelo teaches a laser source for interferometry as shown above in Figure 1.

Curbelo does not teach a mode-locked light source, or a specific laser source.

It is well known in the art to mode-lock or phase-lock laser sources in order to obtain short pulse measurement beams with definite modal phase relationships, thereby obtaining highly coherent pulses for measurement.

It would have been obvious to one of ordinary skill in the art at the time of invention to include a mode-locked source in the apparatus and method of Curbelo so as to achieve a more compact, phase coherent spectrometric measurement.

Claims 3, 5, 19 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Curbelo as applied to claims 1, 2, 8, 9, 13-18, 23-25 and 29-32 above, and further in view of U.S. Patent No. 5,539,518 to Bennett (hereafter Bennett).

Curbelo does not teach an apparatus or method for differential spectral interferograms.

Bennett teaches a method and apparatus for measuring differential spectrometric interferograms, including lock-in, synchronous detection (see columns 3-6, especially the discussion of “spectral fingerprints”).

Bennett does not teach dithering an arm of the interferometer for a continuous phase shift.

It would have been obvious to one of ordinary skill in the art at the time of invention to include the dithering element of Curbelo in the apparatus and method of Bennett so as to achieve the benefit of detected noise reduction, as taught in Curbelo.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick J. Connolly whose telephone number is 571.272.2412. The examiner can normally be reached on 9:00 am - 7:00 pm Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on 571.272.2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

pjq7C  
28.08.2005



Andrew H. Lee  
Primary Examiner  
Art Unit 2877